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**Creating a high spatial resolution CO<sub>2</sub> sensitive 13.3 μm channel for AVHRR and VIIRS**

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The lack of any CO<sub>2</sub> absorption channel on AVHRR and VIIRS degrades the accuracy of the volcanic ash and cloud top pressure/height determinations as well as products related to thermodynamic phase. However, a high spatial resolution 13.3-μm CO<sub>2</sub> channel can be synthesized for AVHRR and VIIRS from a combination of imager and sounder radiances. The creation of a 13.3-μm “pseudo-channel” at the imager spatial resolution is a unique opportunity, possible because the top-of-atmosphere radiances at this wavelength have a contribution from both the surface (about 1/3 of the signal) and the atmosphere, primarily from CO<sub>2</sub> (about 2/3 of the signal). The atmospheric contribution from CO<sub>2</sub> is uniform enough so that sounder measurements (HIRS or IASI or CrIS) at coarser spatial resolution (~20 or 14 km) can be combined with the imager (AVHRR or VIIRS) window channel measurements to synthesize a 13.3-μm channel at imager spatial resolution (1 km or 750 m). The method is being developed and tested using MODIS and AIRS, since MODIS has measured 13.3-μm radiances for assessing the pseudo-channel radiances. Thereafter, the same approach can be applied to NOAA, S-NPP, and Metop.